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— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for all designations*
— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations*

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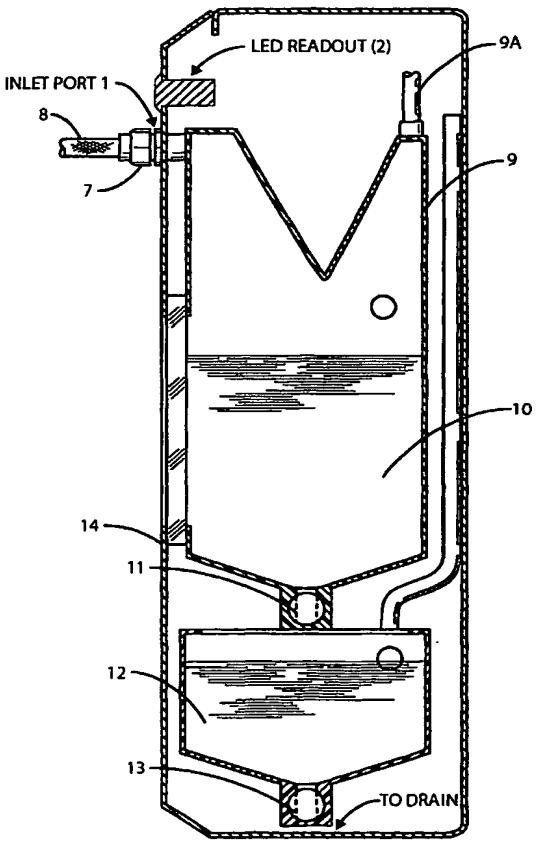
(54) Title: APPARATUS FOR DISPOSING OF LIQUID SURGICAL WASTE



(57) Abstract: Measuring and automatically disposing of infectious waste generated during and after surgical and clinical procedures is provided. The infectious waste removal device includes a suction source, a method for pressure verification, separation chamber (9) for isolating fluids, containment reservoir (10), measurement chamber for determining fluid received, an information source for such fluid volumes (26), a quantitative method for calculating fluid dynamics, a post use cleaning method, and other attributes for use by the surgical team or healthcare staff in order to minimize healthcare worker handling of said infectious waste and to limit their possible exposure.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

AMENDED CLAIMS
[received by the International Bureau on 31 March 2004 (31.03.04);
original claims 1, 7, 9, 10, 12 and 13 replaced by amended claims 1, 7, 9, 10, 12 and 13;
(3 pages);]

1. An apparatus for handling toxic and infectious fluid waste comprising:

(a) a collection chamber adapted to receive fluid waste from a source thereof, the collection chamber having a fluid inlet port, a fluid outlet port and a vacuum port adapted to be connected to a negative pressure source;

(b) means for producing an electrical signal that fluid waste in the collection chamber has reached a predetermined level;

(c) a microprocessor-based controller coupled to receive the electrical signal for controlling the discharge of the fluid waste from the collection chamber and for storing data relating to the volume of fluid waste discharged from the collection chamber while continuing to maintain a negative pressure at the vacuum port.

2. The apparatus as in claim 1 and further including a display panel coupled to the microprocessor-based controller for visually displaying said data.

3. The apparatus as in either claim 1 or claim 2 and further including a solenoid valve mechanically coupled in series with the fluid outlet port and electrically coupled to the microprocessor-based controller, actuation of the solenoid valve by the microprocessor-based controller discharging fluid waste from the collection chamber.

4. The apparatus as in claim 3 and further including a measuring chamber having an inlet port mechanically connected in series with the solenoid valve, the measuring chamber further having an outlet port coupled through a further solenoid valve to a sewer line, the further solenoid electrically coupled to the microprocessor-based controller.

5. The apparatus as in either claim 1 or claim 2 and further including a positive displacement pump coupled to the fluid outlet port of the collection chamber,

the pump being driven by a motor controlled by the microprocessor-based controller to deliver fluid waste to a disposal site.

6. The apparatus as in claim 5 wherein the microprocessor-based controller computes the volume of fluid waste pumped by said positive displacement pump.

7. An apparatus for handling toxic and infectious fluid waste, comprising:

(a) a collection chamber adapted to receive fluid waste from a source thereof, the collection chamber having a fluid inlet port, a fluid outlet port and a suction port adapted to be connected to a vacuum source;

(b) a measuring chamber having a fluid inlet and a fluid outlet;

(c) a first electrically operated valve disposed between the fluid outlet port of the collection chamber and the fluid inlet of the measuring chamber;

(d) a second electrically operated valve disposed between the fluid outlet of the measuring chamber and a sewer line; and

(e) a microprocessor coupled to receive input signals from the measuring chamber for determining a total volume of fluid waste flowing from the collection chamber and through the measuring chamber during a predetermined period of time, said microprocessor providing control signals to the first and second electrically operated valves for controlling the opening and closing thereof while the collection chamber remains connected to the vacuum source.

8. The apparatus as in claim 7 and further including a first alphanumeric display coupled to the microprocessor for indicating said total volumes.

9. The apparatus as in claim 7 wherein the collection chamber has a fluid inlet port coupled by tubing to an end effector.

10. The apparatus as in claim 7 and further including a pressure sensor disposed in the collection chamber, the pressure sensor providing an input to the microprocessor and a second alphanumeric display driven by the microprocessor for providing a visual display of a pressure within the collection chamber.

11. The apparatus as in claim 10 and further including a housing for containing said collection chamber, said measuring chamber, said microprocessor and said first and second electrically operated valves.

12. The apparatus as in claim 11 wherein the first and second alphanumeric displays are visible through at least one opening formed in the housing.

13. The apparatus as in claim 7 and further including a baffle disposed in the collection chamber for preventing liquid waste from flowing through the suction port.

14. The apparatus as in claim 8 and further including a data entry device coupled to the microprocessor.

15. The apparatus as in claim 14 wherein the data entry device is a keypad.

16. The apparatus as in claim 14 wherein the data entry device is a bar code reader.

17. The apparatus as in claim 11 wherein the housing has a window formed therein allowing viewing of the contents of at least one of the collection chamber and the measuring chamber.

STATEMENT UNDER ARTICLE 19(1)

The replacement pages 20-22 containing claims 1-17 are intended to replace the originally submitted pages 20-22 containing claims 1-17. The claims contain modifications intended to clarify and more concisely describe the invention, including differences from references cited.

These claims are consistent with the claims of the application to which this application claims priority.

The newly presented amended claims are believed to be within the scope of the invention described in the specification and, in addition to capturing the inventive concept more concisely, the amended claims enhance the definition over the reference cited in category "X" in the International Search Report.

An important distinction exists between the medical and biological fluid collection and disposal system described in the Seifert et al. U.S. Patent 5,776,118 and the claims of the present application as now amended. The Seifert et al. arrangement, to initiate draining, the vacuum source must be isolated and terminated. The cycle wherein the device drains using gravity then allows the fluid to drain. This cycle will take an undetermined length of time during which the surgical procedure must be halted. This is critical because in order to obtain an accurate measurement of the fluid being drained, the Seifert et al. device must store data pertaining to t he level of fluid within the canister when the device is shut off from the vacuum source. If fluids were permitted to enter the vessel while it is being drained, the measurement of fluid would be inaccurate. Further, the Seifert arrangement takes no account of the presence of foam within the vessel. If the float ball is buoyant in fluid only, then a large amount of foam that might become present in the canister remains unmeasured and may cause the device to backfill the suction line. Further, if the Seifert device is continuously mixing the suction fluid with an outside water source and disinfectant, there is no method specified that measures the amount of fluid being used to dissolve the powdered disinfectant. Therefore, it is probable that the inflow of fluids from the outside source will not be a part of the post-operative fluid management estimates, leading to the probability of significant discordance with the inputted fluids used for irrigation and the actual fluid loss of the patient. Such discordance might present a serious liability on the part of the facility in under or over estimating the actual blood loss of the patient and the subsequent post-operative risk.

Applicants' system measures fluid as it passes from the canister, regardless of where it comes from. Any fluid introduced from the surgical site or a known quantity of fluid from off the site, such as that introduced from a container or vessel containing extra fluids for washing or cleaning, will be measured by the pump. This can be compared by the surgical team to the quantities introduced or suctioned from the patient.

As indicated, with the Seifert system, fluid levels withdrawn from the surgical field are determined by the closing off of the collection vessel from the surgical site. That level is then communicated to the microprocessor and is added to the total removed from the field. This requires suction from the field to be stopped and the procedure halted until the canister is drained. In applicants' system, a continuous measurement is obtained that does **not** require the surgical procedure to be isolated in order to determine an accurate count of fluids removed. Stated otherwise, applicants' system, as claimed, is designed to provide continuous suction without forcing a shut-down of suction to the surgical field while the canister is being drained.